Does a cold October imply a cold winter?

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In Pueblo, the average temperature for October 2009 was 46.1°F, which is the coldest October since records began in 1888. In Colorado Springs, the average temperature for October 2009 was 42.7°F, which is the third coldest October since records began in 1895. At Alamosa, the average temperature was 40.4°F, which is the fifth coldest October since records began in 1932. Is there any relationship between October temperatures and the temperatures for the winter? Does a cold October imply a cold winter?

The data points on the plots below show the mean October temperature along the horizontal axis and the average temperature for the following November through February on the vertical axis. The data extend back for 1888 for Pueblo and 1895 for Colorado Springs. The plots show a large amount of scatter with very little apparent relationship between October temperature and temperature for November through February.

The solid lines on the graphs show the best fit straight line to the data using the least squares method. The lines show a very slight tendency for a cooler October to imply a cooler winter with roughly a 2.5°F change in the mean winter temperature for a 20°F change in the mean October temperature.

The equations for winter temperatures as a function of October temperature for Colorado Springs is:

$$T_{Nov\text{-}Feb} = 26.1 + (.13 * T_{Oct}), \quad R = .174, \quad R^2 = 0.030$$

For Pueblo the equation is:

$$T_{Nov\text{-}Feb} = 27.7 + (.12 * T_{Oct}), \quad R = .132, \quad R^2 = 0.018$$

For Alamosa the equation is:

$$T_{Nov\text{-}Feb} = 33.2 + (-.26*T_{Oct}), \quad R = -.145, \quad R^2 = 0.021$$

The values of R and R^2 imply how well the October temperature predicts the November through February temperatures. The R and R^2 values are very close to zero implying there is no statistically significant relationship between October temperatures and November through February temperatures.

Is there any relationship between October temperatures and November through February temperatures? This brief analysis implies that October temperatures do not predict the November through February temperatures. A cold October does not imply a colder winter and a warmer October does not imply a warmer winter.

How about December through February temperatures?

The equations for winter temperatures as a function of October temperature for Colorado Springs :

$$T_{Dec\text{-}Feb} = 25.6 + (.11*T_{Oct}), \quad R = .119, \quad R^2 = 0.014$$

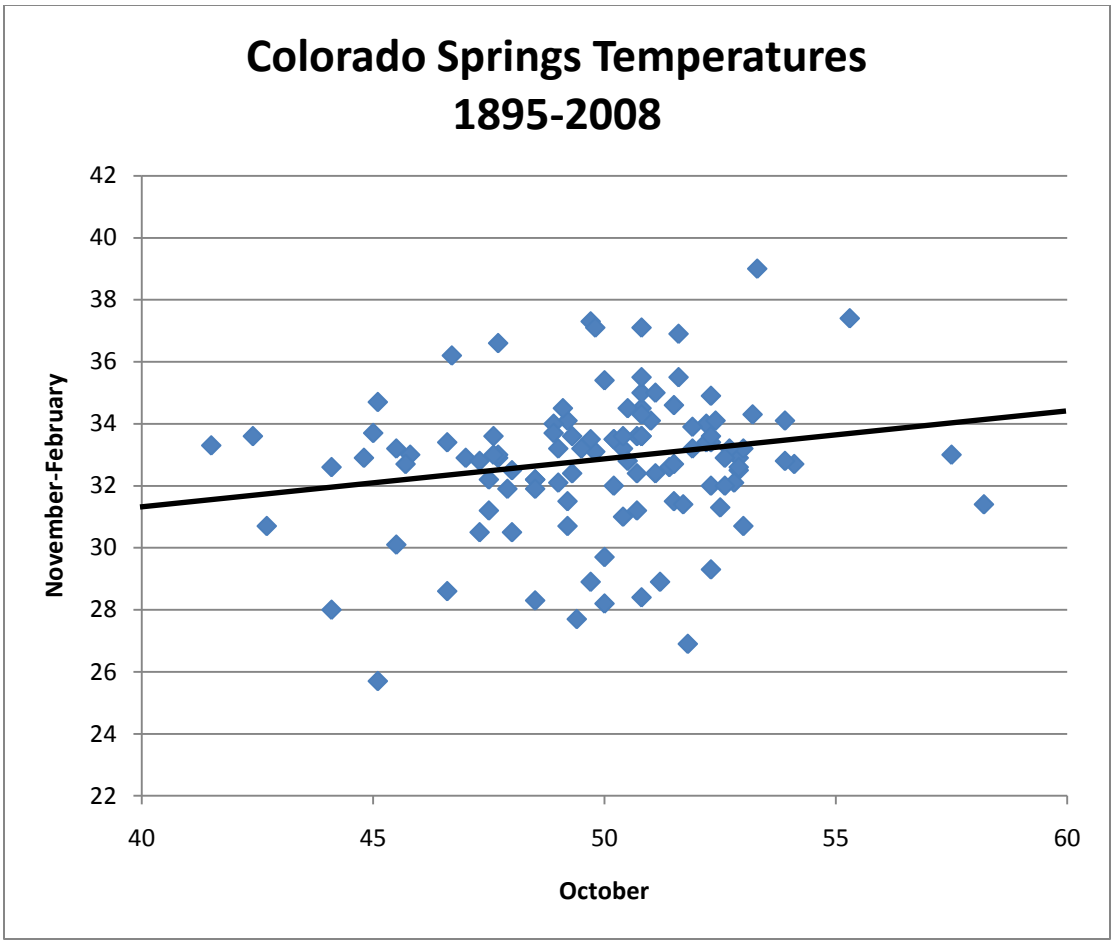
For Pueblo the equation is:

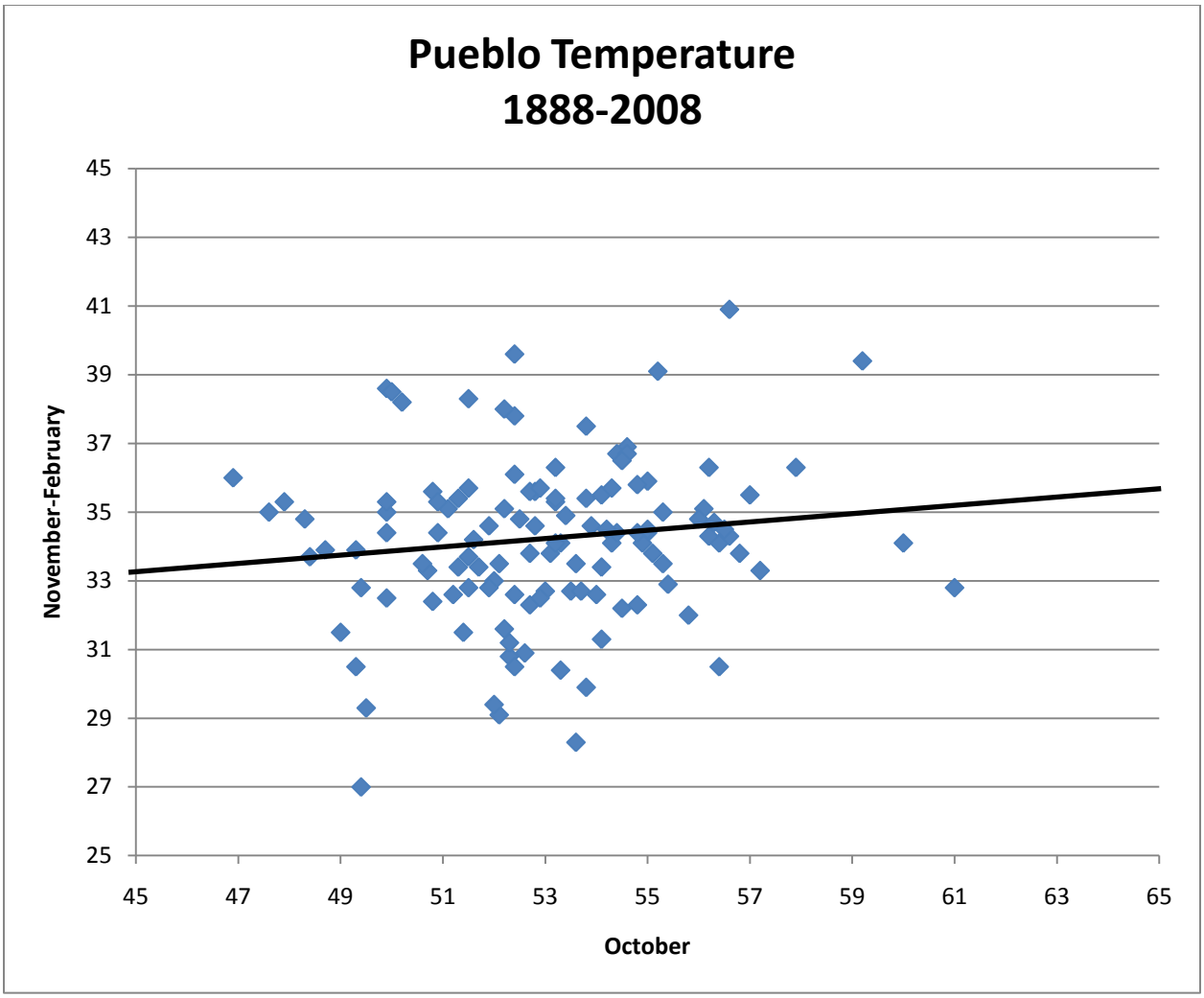
$$T_{Dec\text{-}Feb} = 27.6 + (.09*T_{Oct}), \quad R = .079, \quad R^2 = 0.006$$

For Alamosa the equation is:

$$T_{Dec\text{-}Feb} = 34.4 + (-.35*T_{Oct}), \quad R = -0.16, \quad R^2 = 0.026$$

The R and R^2 values are still very close to zero implying no relationship between October temperature and December through February temperatures.


Colorado Springs Temperatures
1895-2008
November-February
42
40
38
36
34
32
30
28
26
24
22
40
45
50
55
60
October


Pueblo Temperature
1888-2008
November-February
October
45
43
41
39
37
35
33
31
29
27
25
45
47
49
51
53
55
57
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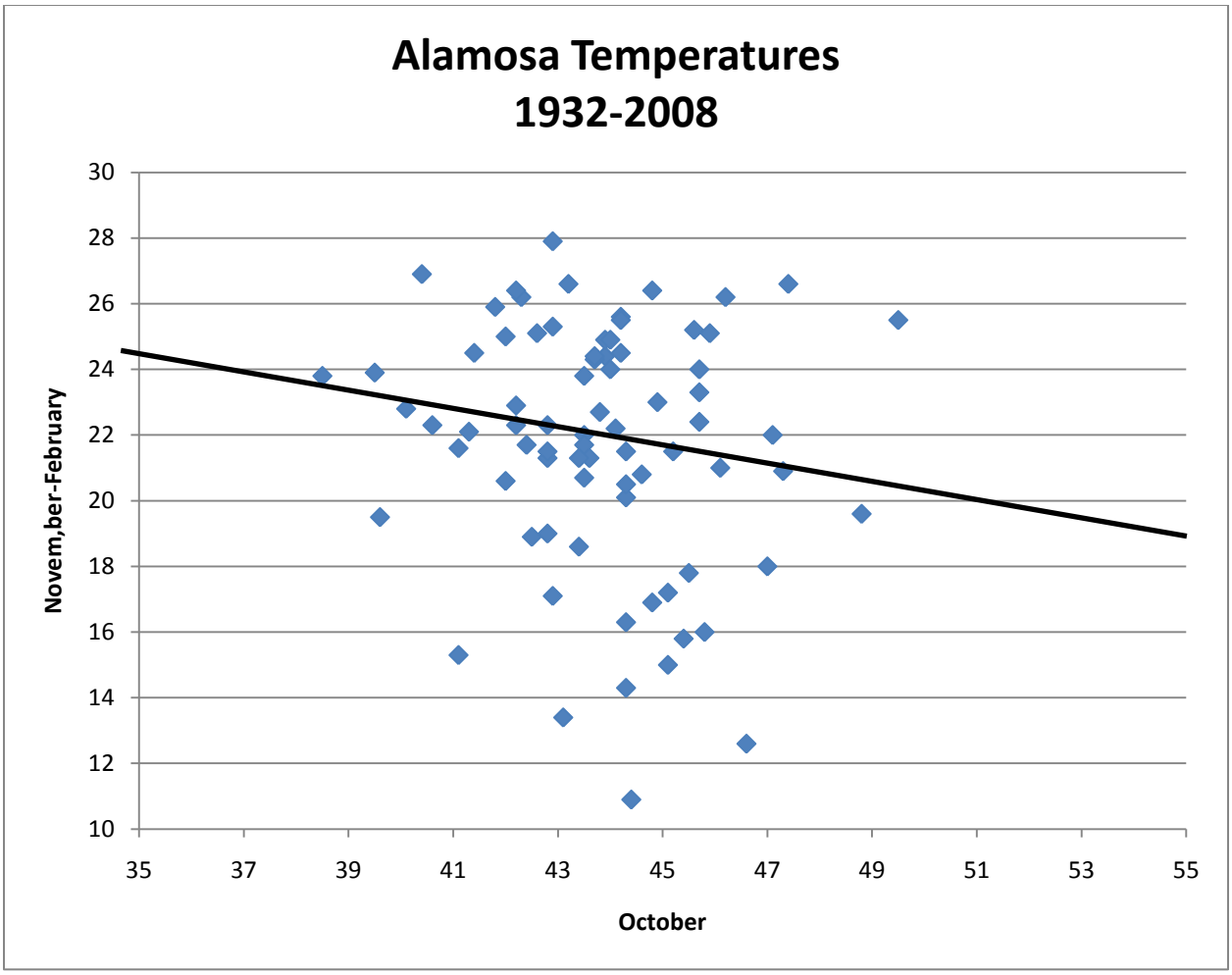
61
63
65


Alamosa Temperatures
1932-2008
Novem,ber-February
October
30
28
26
24
22
20
18
16
14
12
10
35
37
39
41
43
45
47
49
51
53
55